» DIGITAL-LOGIC AG is now a Kontron company «

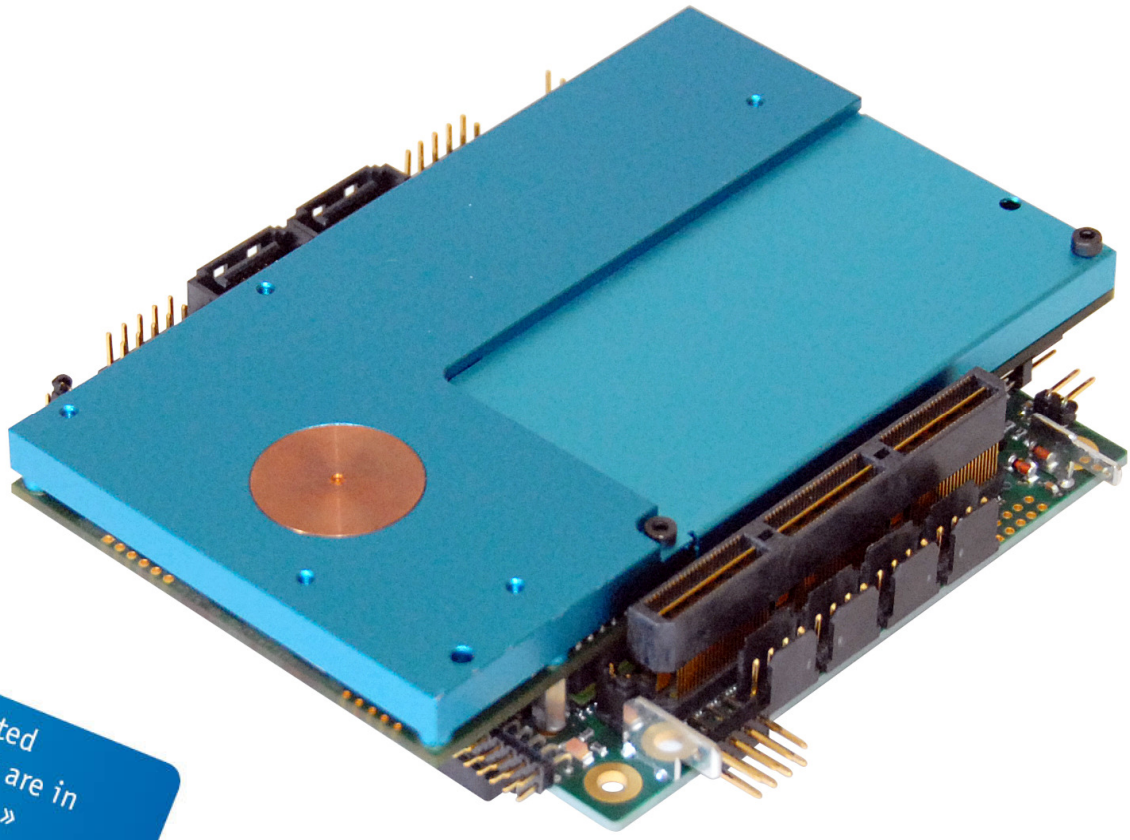
Condensed USER MANUAL FOR:

MICROSPACE®

PCI/104express

Based on the SmartModuleExpress945 (SMX945)

MSM945/L/P



Converted Manuals are in Progress »

Nordstrasse 11/F
CH - 4542 Luterbach
Tel.: **++41 (0)32 681 58 00**
Fax: **++41 (0)32 681 58 01**
Homepage: **http://www.digitallogic.com**
Support: **http://support.kcc-ag.ch**

For internal use only:
File: MSM945_Condensed_V1.1.doc
Path: R:\HANDBUCH\MSM\cpu_boards\MSM945\MSM945_Condensed_V1.1.doc

COPYRIGHT © 2011 BY KONTRON COMPACT COMPUTERS AG

This publication is protected by copyright and all rights are reserved. No part of this document may be reproduced, transmitted, transcribed or stored in a retrieval system, in any form or by any means, electronic, mechanical, optical, manual, or otherwise, without the prior written permission of KONTRON AG.

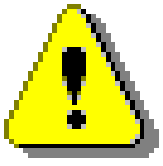
The software described herein, together with this document, are furnished under a license agreement and may be used or copied only in accordance with the terms of that agreement.

About this Manual and How to Use It

This manual is written for the original equipment manufacturer (OEM) who plans to build computer systems based on the single board MICROSPACE-PC. It is for integrators and programmers of systems based on the MICROSPACE-Computer family. This manual provides instructions for installing and configuring the board, and describes the system and setup requirements. This document contains information on hardware requirements, interconnections, and details of how to program the system. Please check the Product CD for further information and manuals.

REVISION HISTORY:

Document Version	Date/Initials:	Modification: Remarks, News, Attention:
V0.1	06.2007 WAS	Initial Version
V0.1A	07.2007 WAS	Corrections / Updated block diagram / Actual photos & screens
V0.1B	10.2007 WAS	New photos
V0.1C	12.2007 WAS	Corrected photo of cabling
V0.1D	02.2008 DAR	Minor Corrections
V1.0	09.2008 WAS	Ext. standard Preface added / Revised to new catalog specs.
V1.1	***05.2011 WAS***	***Kontron logo & conversion to Kontron CI info added to title page.***



Attention!
1. All information in this manual, and the product, are subject to change without prior notice.
2. Read this manual prior to installation of the product.
3. Read the security information carefully prior to installation of the product.

Table of Contents

1. PREFACE 4
1.1. Trademarks 4
1.2. Disclaimer 4
1.3. Environmental Protection Statement 4
1.4. Who should use this Product 4
1.5. Recycling Information 5
1.6. Technical Support 5
1.7. Limited Two Year Warranty 5
1.8. Explanation of Symbols 6
1.9. Applicable Documents and Standards 7
1.10. For Your Safety 8
1.11. RoHS Commitment 8
1.11.1. RoHS Compatible Product Design 9
1.11.2. RoHS Compliant Production Process 9
1.11.3. WEEE Application 9
1.12. Swiss Quality 10
1.13. The Swiss Association for Quality and Management Systems 10
2. OVERVIEW 11
2.1. Standard Features 11
2.2. Unique Features 12
2.3. Standards 12
2.4. Block Diagram 13
2.5. Specifications 14
2.6. Examples of Ordering Codes 17
3. PREPARATION 18
3.1. Print Detailed Manuals from the CD 18
3.2. The LANCON, Part Nr. 803220 19
3.3. Connect Peripherals to the Board 20
4. POWER UP THE BOARD 22
4.1. BIOS Setup 25
4.2. Boot Up the Operating System and Install the Drivers 25
5. INDEX 26

1. PREFACE

The information contained in this manual has been carefully checked and is believed to be accurate; it is subject to change without notice. Product advances mean that some specifications may have changed. Kontron AG assumes no responsibility for any inaccuracies, or the consequences thereof, that may appear in this manual. Furthermore, Kontron AG does not accept any liability arising from the use or application of any circuit or product described herein.

1.1. Trademarks

MICROSPACE®, smartModule®, smartCore®Express and DIGITAL-LOGIC® are trademarks or registered trademarks of Kontron Compact Computers AG. Kontron is a trademark or registered trademark of Kontron AG. In addition, this document may include names, company logos, and registered trademarks which are, therefore, proprietary to their respective owners.

1.2. Disclaimer

Kontron Compact Computers (KCC) makes no representations or warranties with respect to the contents of this manual, and specifically disclaims any implied warranty of merchantability or fitness, for any particular purpose. KCC shall, under no circumstances, be liable for incidental or consequential damages or related expenses resulting from the use of this product, even if it has been notified of the possibility of such damage.

1.3. Environmental Protection Statement

This product has been manufactured to satisfy environmental protection requirements wherever possible. Many of the components used (structural parts, printed circuit boards, connectors, batteries, etc.) are capable of being recycled. Final disposal of this product after its service life must be accomplished in accordance with applicable country, state, or local laws or regulations.

1.4. Who should use this Product

- Electrical engineers with know-how in PC-technology.
- Because of the complexity and the variability of PC-technology, we cannot guarantee that the product will work in any particular situation or set-up. Our technical support will try to help you find a solution.
- Pay attention to electrostatic discharges; use a CMOS protected workplace.
- Power supply must be OFF when working on the board or connecting any cables or devices.

1.5. Recycling Information

All components within this product fulfill the requirements of the RoHS (Restriction of Hazardous Substances Directive). The product is soldered with a lead free process.

1.6. Technical Support

1. Contact your local Kontron Technical Support, in your country.
2. Use the Internet Support Request form at http://support.kcc-ag.ch/ ➔ embedded products ➔ New Support Request

Support requests are only accepted with detailed information about the product (i.e., BIOS-, Board-version)!

1.7. Limited Two Year Warranty

Kontron Compact Computers (KCC) guarantees the hardware and software products it manufactures and produces to be free from defects in materials and workmanship for two years following the date of shipment from Kontron Compact Computers, Switzerland. This warranty is limited to the original purchaser of the product and is not transferable.

During the two year warranty period, Kontron Compact Computers will repair or replace, at its discretion, any defective product or part at no additional charge, provided that the product is returned, shipping prepaid, to KCC. All replaced parts and products become property of KCC.

Before returning any product for repair, direct customers of Kontron Compact Computers AG, Switzerland are required to register a RMA (Return Material Authorization) number in the Support Center at
http://support.kcc-ag.ch/

All other customers must contact their local distributors for returning defective materials.

This limited warranty does not extend to any product which has been damaged as a result of accident, misuse, abuse (such as use of incorrect input voltages, wrong cabling, wrong polarity, improper or insufficient ventilation, failure to follow the operating instructions that are provided by Kontron Compact Computers or other contingencies beyond the control of KCC), wrong connection, wrong information or as a result of service or modification by anyone other than Kontron Compact Computers. Nor if the user has insufficient knowledge of these technologies or has not consulted the product manuals or the technical support of KCC and therefore the product has been damaged.

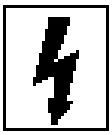
Empty batteries (external and onboard), as well as all other battery failures, are not covered by this manufacturer's limited warranty.

Except, as directly set forth above, no other warranties are expressed or implied, including, but not limited to, any implied warranty of merchantability and fitness for a particular purpose, and Kontron Compact Computers expressly disclaims all warranties not stated herein. Under no circumstances will KCC be liable to the purchaser or any user for any damage, including any incidental or consequential damage, expenses, lost profits, lost savings, or other damages arising out of the use or inability to use the product.

1.8. Explanation of Symbols

CE Conformity
This symbol indicates that the product described in this manual is in compliance with all applied CE standards.

Caution, Electric Shock!
This symbol and title warn of hazards due to electrical shocks (> 60V) when touching products or parts of them. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your equipment.



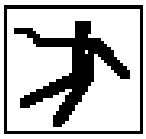
Caution, Electric Shock!
This symbol and title warn of hazards due to electrical shocks (> 32V) when touching products or parts of them. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your equipment

Warning, ESD Sensitive Device!
This symbol and title inform that electronic boards and their components are sensitive to Electro Static Discharge (ESD). In order to ensure product integrity at all times, care must always be taken while handling and examining this product.

Attention!
This symbol and title emphasize points which, if not fully understood and taken into consideration by the reader, may endanger your health and/or result in damage to your equipment.

Note...
This symbol and title emphasize aspects the user should read through carefully for his, or her, own advantage.

Warning, Heat Sensitive Device!
This symbol indicates a heat sensitive component.



Safety Instructions
This symbol shows safety instructions for the operator to follow.

This symbol warns of general hazards from mechanical, electrical, and/or chemical failure. This may endanger your life/health and/or result in damage to your equipment.

1.9. Applicable Documents and Standards

The following publications are used in conjunction with this manual. When any of the referenced specifications are superseded by an approved revision, that revision shall apply. All documents may be obtained from their respective organizations.

- Advanced Configuration and Power Interface Specification Revision 2.0c, August 25, 2003 Copyright © 1996-2003 Compaq Computer Corporation, Intel Corporation, Microsoft Corporation, Phoenix Technologies Ltd., Toshiba Corporation. All rights reserved. http://www.acpi.info/
- ANSI/TIA/EIA-644-A-2001: Electrical Characteristics of Low Voltage Differential Signaling (LVDS) Interface Circuits, January 1, 2001. http://www.ansi.org/
- ANSI INCITS 361-2002: AT Attachment with Packet Interface - 6 (ATA/ATAPI-6), November 1, 2002. http://www.ansi.org/
- ANSI INCITS 376-2003: American National Standard for Information Technology – Serial Attached SCSI (SAS), October 30, 2003. http://www.ansi.org/
- Audio Codec '97 Revision 2.3 Revision 1.0, April 2002 Copyright © 2002 Intel Corporation. All rights reserved. http://www.intel.com/labs/media/audio/
- Display Data Channel Command Interface (DDC/CI) Standard (formerly DDC2Bi) Version 1, August 14, 1998 Copyright © 1998 Video Electronics Standards Association. All rights reserved. http://www.vesa.org/summary/sumddcci.htm
- ExpressCard Standard Release 1.0, December 2003 Copyright © 2003 PCMCIA. All rights reserved. http://www.expresscard.org/
- IEEE 802.3-2002, IEEE Standard for Information technology, Telecommunications and information exchange between systems–Local and metropolitan area networks–Specific requirements – Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications. http://www.ieee.org
- IEEE 802.3ae (Amendment to IEEE 802.3-2002), Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications, Amendment: Media Access Control (MAC) Parameters, Physical Layers, and Management Parameters for 10 GB/s Operation. http://www.ieee.org
- Intel Low Pin Count (LPC) Interface Specification Revision 1.1, August 2002 Copyright © 2002 Intel Corporation. All rights reserved. http://developer.intel.com/design/chipsets/industry/lpc.htm
- PCI Express Base Specification Revision 1.1, March 28, 2005, Copyright © 2002-2005 PCI Special Interest Group. All rights reserved. http://www.pcisig.com/
- PCI Express Card Electromechanical Specification Revision 1.1, March 28, 2005, Copyright © 2002-2005 PCI Special Interest Group. All rights reserved. http://www.pcisig.com/
- PCI Local Bus Specification Revision 2.3, March 29, 2002 Copyright © 1992, 1993, 1995, 1998, 2002 PCI Special Interest Group. All rights reserved. http://www.pcisig.com/
- PCI-104 Specification, Version V1.0, November 2003. All rights reserved. http://www.pc104.org
- PICMG® Policies and Procedures for Specification Development, Revision 2.0, September 14, 2004, PCI Industrial Computer Manufacturers Group (PICMG®), 401 Edgewater Place, Suite 500, Wakefield, MA 01880, USA, Tel: 781.224.1100, Fax: 781.224.1239. http://www.picmg.org/
- Serial ATA: High Speed Serialized AT Attachment Revision 1.0a January 7, 2003 Copyright © 2000-2003, APT Technologies, Inc, Dell Computer Corporation, Intel Corporation, Maxtor Corporation, Seagate Technology LLC. All rights reserved. http://www.sata-io.org/

- Smart Battery Data Specification Revision 1.1, December 11, 1998. www.sbs-forum.org
- System Management Bus (SMBus) Specification Version 2.0, August 3, 2000 Copyright © 1994, 1995, 1998, 2000 Duracell, Inc., Energizer Power Systems, Inc., Fujitsu, Ltd., Intel Corporation, Linear Technology Inc., Maxim Integrated Products, Mitsubishi Electric Semiconductor Company, Power-Smart, Inc., Toshiba Battery Co. Ltd., Unitrode Corporation, USAR Systems, Inc. All rights reserved. http://www.smbus.org/
- Universal Serial Bus Specification Revision 2.0, April 27, 2000 Copyright © 2000 Compaq Computer Corporation, Hewlett-Packard Company, Intel Corporation, Lucent Technologies Inc., Microsoft Corporation, NEC Corporation, Koninklijke Philips Electronics N.V. All rights reserved. http://www.usb.org/

1.10. For Your Safety

Your new Kontron Compact Computers (KCC) product was developed and tested carefully to provide all features necessary to ensure its compliance with electrical safety requirements. It was also designed for a long, fault-free life. However, this life expectancy can be drastically reduced by improper treatment during unpacking and installation. Therefore, in the interest of your own safety and for the correct operation of your new KCC product, please comply with the following guidelines.

Attention!
All work on this device must only be carried out by sufficiently skilled personnel.

Caution, Electric Shock!
Before installing your new KCC product, always ensure that your mains power is switched off. This applies also to the installation of piggybacks or peripherals. Serious electrical shock hazards can exist during all installation, repair and maintenance operations with this product. Therefore, always unplug the power cable and any other cables which provide external voltage before performing work.

Warning, ESD Sensitive Device!
Electronic boards and their components are sensitive to static electricity. In order to ensure product integrity at all times, be careful during all handling and examinations of this product.

1.11. RoHS Commitment

Kontron Compact Computers is committed to develop and produce environmentally friendly products according to the Restriction of Hazardous Substances (RoHS) Directive (2002/95/EC) and the Waste Electrical and Electronic Equipment (WEEE) Directive (2002/96/EC) established by the European Union. The RoHS directive was adopted in February 2003 by the European Union and came into effect on July 1, 2006. It is not a law but a directive, which restricts the use of six hazardous materials in the manufacturing of various types of electronic and electrical equipment. It is closely linked with the Waste Electrical and Electronic Equipment Directive (WEEE) 2002/96/EC, which has set targets for collection, recycling and recovery of electrical goods and is part of a legislative initiative to solve the problem of huge amounts of toxic e-waste.

Each European Union member state is adopting its own enforcement and implementation policies using the directive as a guide. Therefore, there could be as many different versions of the law as there are states in the EU. Additionally, non-EU countries like China, Japan, or states in the U.S. such as California may have their own regulations for green products, which are similar, but not identical, to the RoHS directive.

RoHS is often referred to as the "lead-free" directive but it restricts the use of the following substances:

- Lead
- Mercury
- Cadmium
- Chromium VI
- PBB and PBDE

The maximum allowable concentration of any of the above mentioned substances is 0.1% (except for Cadmium, which is limited to 0.01%) by weight of homogeneous material. This means that the limits do not apply to the weight of the finished product, or even to a component but to any single substance that could (theoretically) be separated mechanically.

1.11.1. RoHS Compatible Product Design

All Kontron Compact Computers (KCC) standard products comply with RoHS legislation.

Since July 1, 2006, there has been a strict adherence to the use of RoHS compliant electronic and mechanical components during the design-in phase of all KCC standard products.

1.11.2. RoHS Compliant Production Process

Kontron Compact Computers selects external suppliers that are capable of producing RoHS compliant devices. These capabilities are verified by:

1. A confirmation from the supplier indicating that their production processes and resulting devices are RoHS compliant.
2. If there is any doubt of the RoHS compliancy, the concentration of the previously mentioned substances in a produced device will be measured. These measurements are carried out by an accredited laboratory.

1.11.3. WEEE Application

The WEEE directive is closely related to the RoHS directive and applies to the following devices:

- Large and small household appliances
- IT equipment
- Telecommunications equipment (although infrastructure equipment is exempt in some countries)
- Consumer equipment
- Lighting equipment – including light bulbs
- Electronic and electrical tools
- Toys, leisure and sports equipment
- Automatic dispensers

It does not apply to fixed industrial plants and tools. The compliance is the responsibility of the company that brings the product to market, as defined in the directive. Components and sub-assemblies are not subject to product compliance. In other words, since Kontron Compact Computers does not deliver ready-made products to end users the WEEE directive is not applicable for KCC. Users are nevertheless encouraged to properly recycle all electronic products that have reached the end of their life cycle.

1.12. Swiss Quality

- 100% Made in Switzerland
- This product was ***not*** manufactured by employees earning piecework wages
- This product was manufactured in humane work conditions
- All employees who worked on this product are paid customary Swiss market wages and are insured
- ISO 9000:2001 (quality management system)

1.13. The Swiss Association for Quality and Management Systems

The Swiss Association for Quality and Management Systems (SQS) provides certification and assessment services for all types of industries and services. SQS certificates are accepted worldwide thanks to accreditation by the Swiss Accreditation Service (SAS), active membership in the International Certification Network, IQNet, and co-operation contracts/agreements with accredited partners.

www.sqs.ch

The SQS Certificate ISO 9001:2000 has been issued to Kontron Compact Computers AG, the entire company, in the field of development, manufacturing and sales of embedded computer boards, embedded computer modules and computer systems. The certification is valid for three years at which time an audit is performed for recertification.

2. OVERVIEW

2.1. Standard Features

The MICROSPACE PCI/104express MSM945 is a miniaturized modular device incorporating the major elements of a PC/AT compatible computer. It includes standard PC/AT compatible elements, such as:

- Powerful Core Duo, Core Solo or Core 2 Duo
- BIOS ROM
- DDR2 RAM 256-2048MByte SODIMM 200pin
- 2048/4096kByte second level cache
- Timers
- DMA
- Real-time clock with CMOS-RAM and 10-year battery buffer
- LPT1 parallel port
- COM1-, COM2- RS232 serial port 16C550 comp.
- Speaker interface
- PS/2-keyboard interface and PS/2-mouse interface
- Floppy disk interface
- AT-IDE hard disk interface
- 2x S-ATA 1.5GB/s hard disk interfaces
- Video interfaces: DVI, VGA, LVDS
- 7.1 channel sound interface AC97-V2.3
- 100/10-Base T-LAN
- Optional: PCI/104 BUS
- PCI/104express Bus
- Power management functions APM and ACPI
- 8 channel USB V1.1 & V2.0

Since board version 2.0 the MSM945 is PCI/104-Express, version 1.0 compliant.

2.2. Unique Features

The MICROSPACE MSM945 includes all standard PC/AT functions plus unique KCC enhancements, such as:

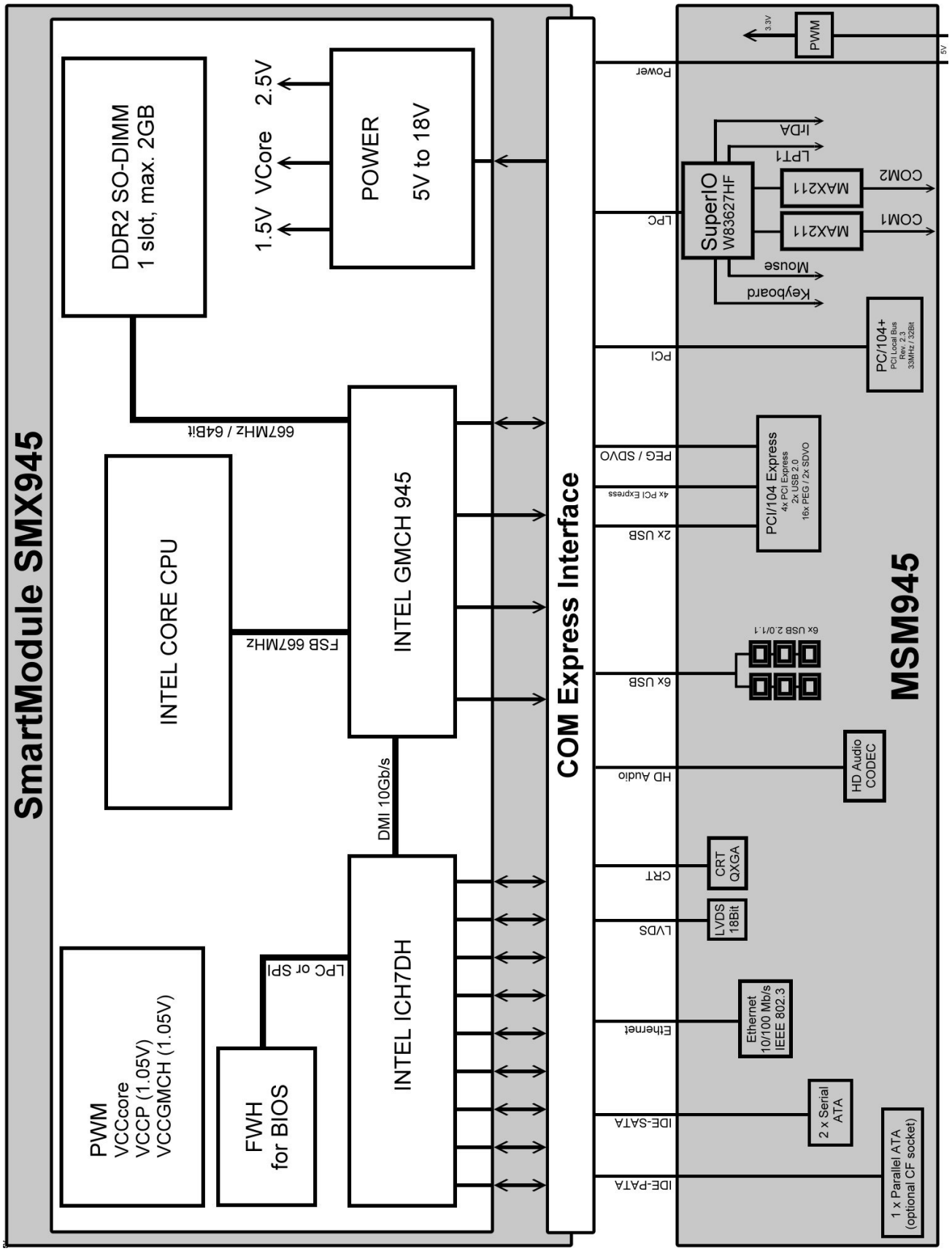
- Single 5V or a 5V & 12V supply input
- Watchdog
- Power-fail detection
- EEPROM for setup and configuration
- IrDA
- Optional: Compact Card holder
- UL approved parts
- Console redirection

2.3. Standards

This MICROSPACE product meets all standards for personal computer architecture.

Standard	Contact to the organization	Remarks
PC/104BUS	www.pc104.org	Use only for KCC AG
USB	www.usb.org	
PCI	www.pcisig.com	
PCI Express	www.pcisig.com	
SMB	www.smbus.org	
WfM	www.intel.com/labs/manage/wfm	Wired for management baseline
AC97	www.developer.intel.com/ial/scalableplatforms/audio	
LPC	www.developer.intel.com/design/chipsets/industry/lpc.htm	
ATA/ATAPI-6	www.t13.org	
ACPI	www.acpi.info	Power management

2.4. Block Diagram



2.5. Specifications

CPU	Specification
CPU SMX945-L2400	**INTEL** **Core Duo-L2400 with 2x 1.66GHz, 2MB-L2cache, 65nm, LV** **Core Solo-M423 with 1x 1.00GHz, 1MB-L2cache, 65nm, ULV** **Core Celeron-M440 with 1x 1.86GHz, 1MB-L2cache** **Core 2 Duo-L7400 with 2x 1.50GHz, 4MB-L2cache, 65nm LV** **Located in the smartModuleExpress945**
Compatibility	Carrier board connector complies to COMexpress type 2
1st Level Cache	32k data and 32k code
2nd Level Cache	2048 / 4096 kByte
Clock	The CPU Clock is defined with the ordered SMX945-Lxxxx0
FSB	533 / 677 MHz
Power Management	Yes, APM2.1 and ACPI 1.2
FPU	Integrated

Chipset	Specification
Northbridge	945GM from INTEL
Southbridge	For pre-series ICH7M: 4x PCIe, no RAID on SATA For the series ICH7MDH: 6x PCIe and RAID 0/1 on SATA All Intel Chips are members of the long availability roadmap
LAN	Integrated (approx. comparable to an 82C559 INTEL)
Audio	AC97 – V2.3 7.1-Sound
Firewire IEEE1394	Not on board
Video	Intel extreme graphic 950I DirectX-9 compatible, 224MByte Video-DDR2 RAM

Memory	Specification
Main Memory SMX945 SMX945B	1x SODIMM socket SDRAM DDR2-667, 64bit, 256MByte up to 2048MByte stacked SDRAM DDR2-667, 64bit, 512MByte up to 3072MByte stacked
Flash-BIOS	8MByte Flash
Setup EEPROM	2kByte for CMOS-backup
Flash-VideoBIOS:	Combined in the core BIOS
Video RAM	Up to 256MByte DDR2 RAM

Video Controller	Specification
Controller	Intel extreme graphic 950 integrated in the Intel945GM chipset
Video Memory	Up to 256MB
Channel 1	CRT QXGA up to 2048 x 1600 pixels
Channel 2	Optional and external DVI, LVDS Converter
Bootup-Resolution	640 x 480 / 800 x 600 / 1024 x 768
2D-Graphics	Integrated accelerator
3D-Graphics	Integrated accelerator
Direct-X Version	9
PnP	Integrated

External Interface	Specification
Video Interfaces	CRT, DVI, LVDS, DVO-PortC
USB V1.1/2.0	8 channels
LPT1	IEEE1293 Printer
COM1	RS232C, RS422, RS485 jumper selectable
COM2	RS232C, RS422, RS485 jumper selectable
Keyboard	PS/2
Mouse	PS/2
Floppy	26pin FCC Interface for TEAC Mini-floppy
Parallel-Hard disk	1 channel 44pin RM2.0mm ATAIDE-cable
Serial-Hard disk	2 channel SATA
Speaker	0.1Watt Speaker
ISA-Bus	Not available onboard
PCI-Bus	PC/104+, *optional*
PCIe	PCI/104express only on MSM945P (bottom side) available

Power Supply	Specification
Input voltage	Nom. 5V, maximum Ripple=200mVpp
Input inrush current	Typical 20Amp over 100µs
Protection	None
Spec.	None
3.3Volt Power Output	PCI-Bus: 2Amp

Power Consumption	Specification
With 512MByte	With L2400: typical Standby 8W, maximum load 20W With M423: typical Standby 8W, maximum load 15W With M440: typical Standby 11W, maximum load 30W With L7400: typical Standby 10W, maximum load 32W
Standby	
Power off	Typical 35 mA

Physical Characteristics	Specification PC/104plus
Dimensions	Length: 99mm Depth: 90.17mm, SMX945: 115mm Height: 33.5mm maximum with all options
Weight	500gr with SMX945 and all options

Operating Environment	Specification	
Relative Humidity	5-90% non-condensing IEC68-2-30	at -20° to +50°C operating
Vibration operating	IEC68-2-6	10-50Hz, 0.075mm and 55-500Hz, 1.0G
Vibration non-operating	IEC68-2-6	10-50Hz, 0.15mm and 55-500Hz, 2.0G
Shock operating	IEC68-2-27	10G, 11ms ½ sine
Shock non-operating	IEC68-2-27	50G, 11ms, ½ sine
Altitude	IEC68-2-13	4571 meter operating
Temperature operating	IEC68-2-1, 2, 14:	depends on the selected CPU performance
Extended Temp. Option	MIL-810-501/502	(see separate table below)
Temperature storage	IEC68-2-1 ,2, 14:	-65°C to +125°C *

* The back-up battery is limited on
-40°C to +80°C operating and storage temperature!

Operating Temperature	Specification: MIL-810-501 MIL-810-502
Extended temperature range SMX945-L2400	 -40°C to +50°C

EMI / EMC Tests	Specification
EMC emission EN61000-6-2:2001	
Conducted Disturbance	EN55022 Class B
Radiated Disturbance	EN55022 Class B
EMC immunity EN61000-6-2	
Electrostatic discharge (ESD)	EN61000-4-2 Voltage = 4kV contact / 8kV air, Criteria A
Radiated RF-Field	EN61000-4-3 Level = 10V/m, Criteria A
Electrical fast transients (Burst)	EN61000-4-4 Grade 2: DC-Power lines = 1000V (5/50ns) Grade 2: AC-Power lines = 2000V (5/50ns) Grade 2: Signal lines = 500V (5/50ns) Criteria B
Surge	EN61000-4-5 Grade 2: DC-Power lines = 1kV, (1.2/50us) Grade 2: AC-Power lines = 2kV, (1.2/50us) Criteria B
Conducted Disturbance	EN61000-4-6 Voltage = 10V coupled by case, Criteria A

Security	Specification
e1	Not planned
UL	Not planned
ETS 301	Not planned
CE/SEV	Yes
Safety	AR385-16

All information is subject to change without notice.

2.6. Examples of Ordering Codes

The MSM945 system is combined from:

- Baseboard MSM945
- SmartModuleExpress945-L2400 must be ordered separately
- Memory: SODIMM200-DDRAM2 must be ordered separately

Article	Part. No.	Description
MSM945	803200	PCI/104express board, without SMX945, 0MB RAM
		For 256 up to 2048MB DDR2-Memory
SMX945-L7400	805352	SmartModuleExpress 2x 1.5GHz Intel Core2Duo, 4MB Cache
SMX945-L2400	805350	SmartModuleExpress 2x 1.66GHz Intel Core Duo, 4MB Cache
SMX945-M423	805360	SmartModuleExpress 1x 1.0GHz Intel Core Solo, 2MB Cache
		For 512 up to 3072MB DDR2-Memory
SMX945B-L7400	805452	SmartModuleExpress 2x 1.5GHz Intel Core2Duo, 4MB Cache
SMX945B-L2400	805450	SmartModuleExpress 2x 1.66GHz Intel Core Duo, 4MB Cache
SMX945B-M423	805460	SmartModuleExpress 1x 1.0GHz Intel Core Solo, 2MB Cache
Accessories	**Part. No.**	**Description**
MSFloppy	891001	3.5” Micro-Floppy drive (26Pin)
MSFDCK	802600	Micro-Floppy cable (26Pin)
MSEBX945-DK	811347	Aluminum housing with 20GB HDD, FDD, CD-R, PSU
Options	**Part. No.**	**Description**
Option-CF	807008	Compact Flash Socket (without option L+)
DDRAM256M	890674	DDR2-SODIMM Module 256MB
DDR2RAM512M	890675	DDR2-SODIMM Module 512MB
DDR2RAM1G	890676	DDR2-SODIMM Module 1GB
DDR2RAM2G	890677	DDR2-SODIMM Module 2GB
Passive cooler	805370	SMX945 cooler without fan
Active cooler	805371	SMX945 cooler with fan

These are only examples; for current ordering codes, please see the current price list.

3. PREPARATION

Warning, ESD Sensitive Device!
Place the embedded computer board on an isolated, ESD-protected surface. Also ensure that all equipment, tools and people are fully protected against ESD.

3.1. Print Detailed Manuals from the CD

Note...
Place the Product-CD into the CD-Drive of a personal computer with a connected printer. Open the CD; open the directory MSM945.

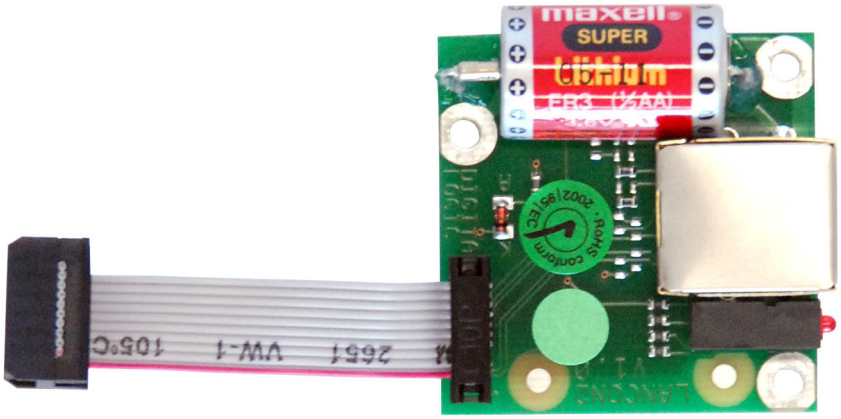
Printout the following detailed manuals:

The technical/hardware manual: MSM945 Detailed.pdf

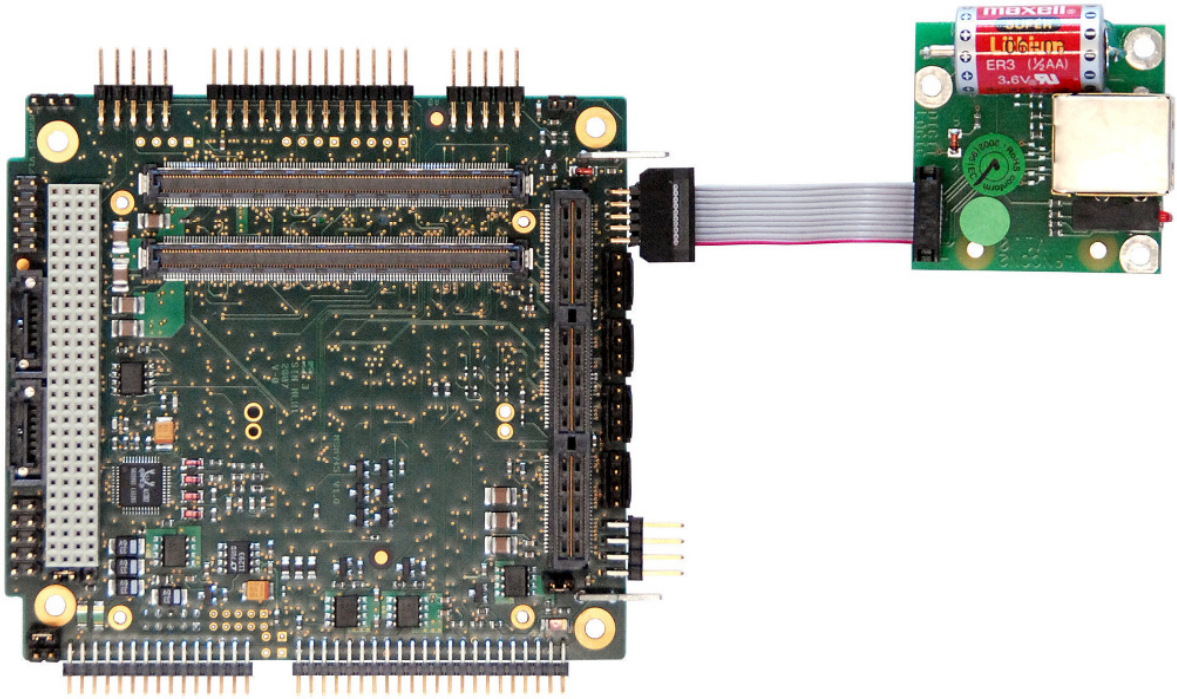
The driver/software/BIOS manual: SMX945 BIOS.pdf

The technical/hardware manual: SMX945 Detailed.pdf

3.2. The LANCON, Part Nr. 803220



The LANCON connected to the board:



3.3. Connect Peripherals to the Board

Prepare the following peripherals:

- VGA Monitor (LCD or CRT) with a resolution up to 1024x768pixel
- PS2 Keyboard
- USB Mouse
- LAN-Cable, if available
- Hard disk or CompactFlash
- USB CD-Drive or Floppy drive
- Power supply with 5Volt and min. 75Watts

1. Connect the VGA-Monitor to the 15pin high density DSub-connector.
2. Connect the Keyboard to the PS/2 connector.
3. Connect the USB-Mouse to one of the USB-connectors.
4. Connect the hard disk with a 44pin cable to the IDE-connector.

   Alternatively to the hard disk, the CompactFlash-Card may be inserted into the CF-socket.

The polarity must be correct. Pin1 of the cable must go to Pin1 of the connector, which has a red mark next to it (not visible in the photo). Otherwise the hard disk and/or the computer may be destroyed.

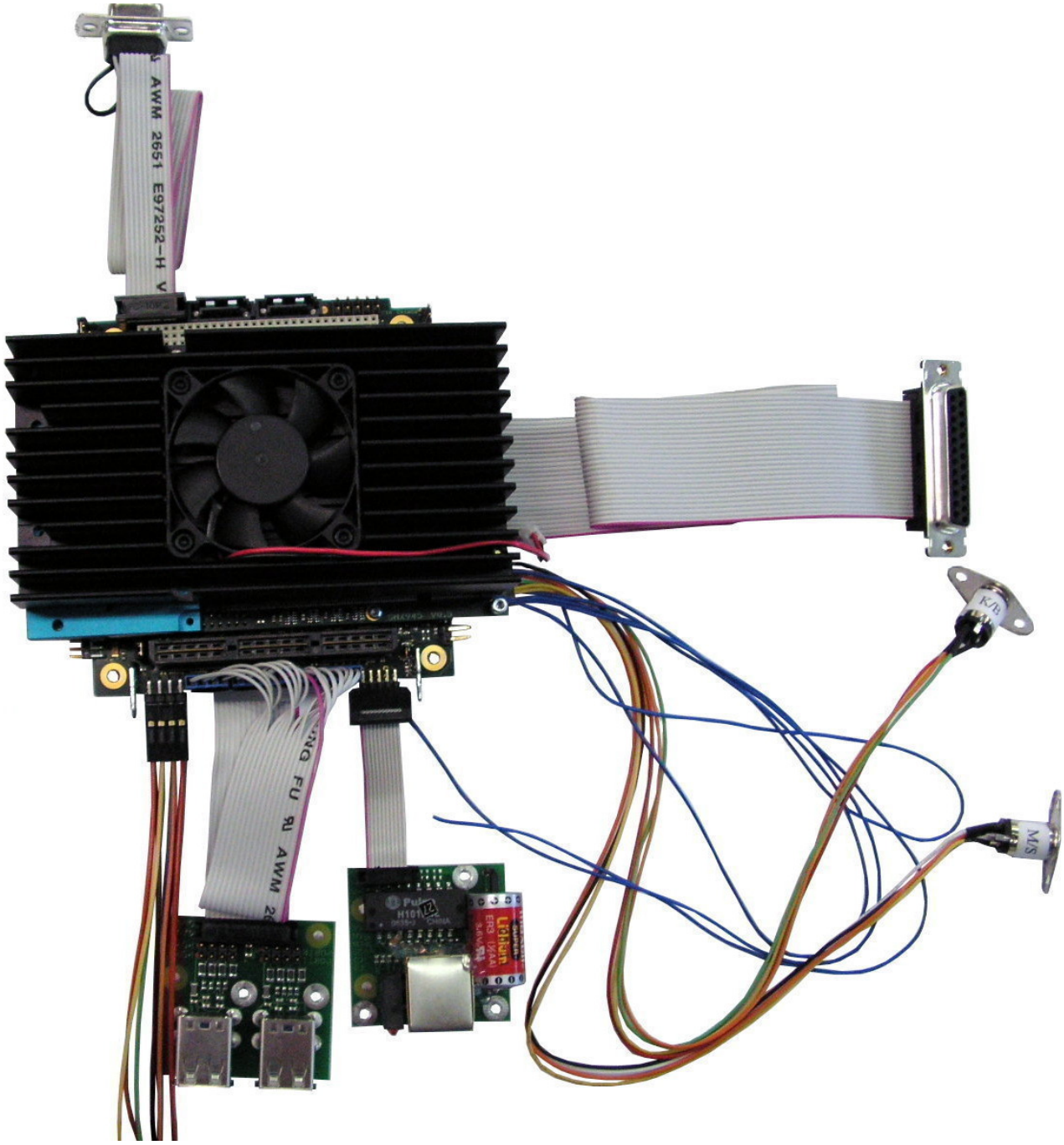
5. Connect a USB CD-Drive or a USB Floppy drive to one of the USB connectors.

6. Connect the 5Volt power supply to the power input of the computer board.

The polarity must be correct. Otherwise the electronic board may be destroyed.

7. Insert a boot device: USB-Stick, Floppy or bootable CF.

MSM945 with SMX945, active cooler and cabling



4. POWER UP THE BOARD

ATTENTION!
The following description is NOT specific to the MSM945 which will follow in a later version of this manual. This is a general description and Kontron Compact Computers AG shall, under no circumstances, be liable for incidental or consequential damages or related expenses resulting from the use of this product.

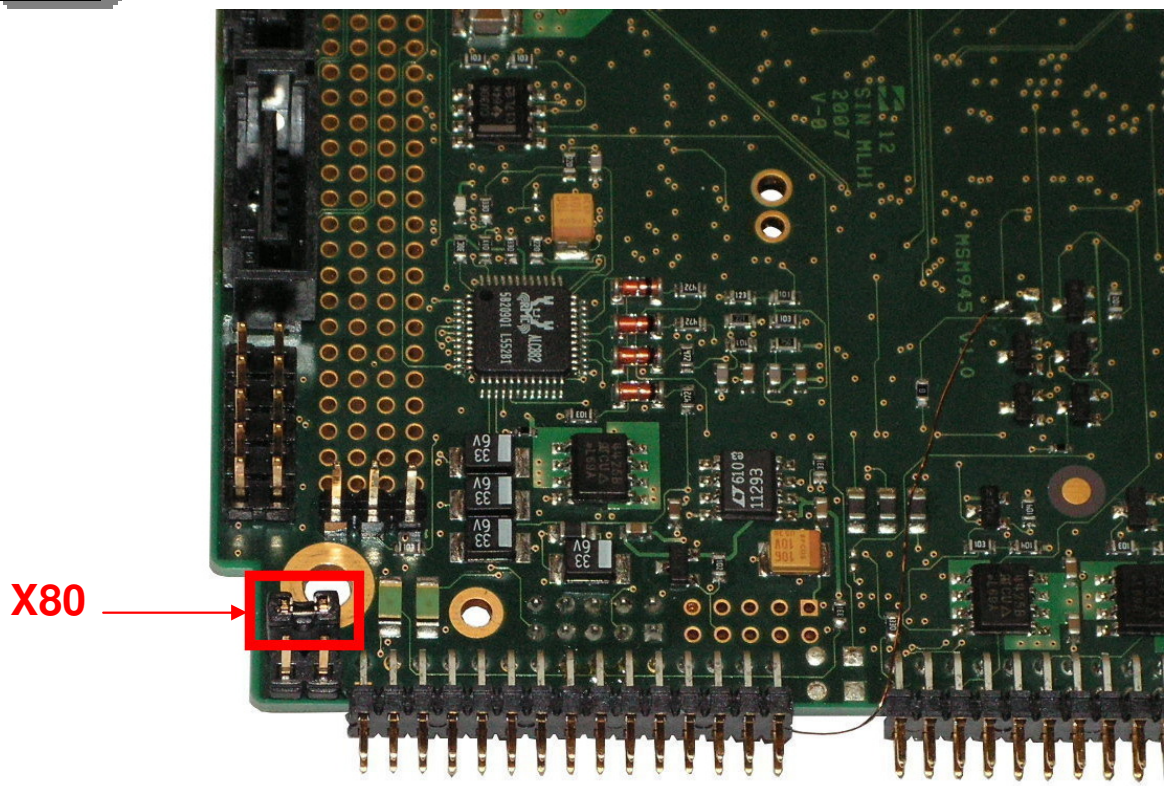
Check that the voltage is regulated to +5 Volts and that the polarity is correct.

Attention!
The supply voltage must be 5V.

Switch on the connected monitor.

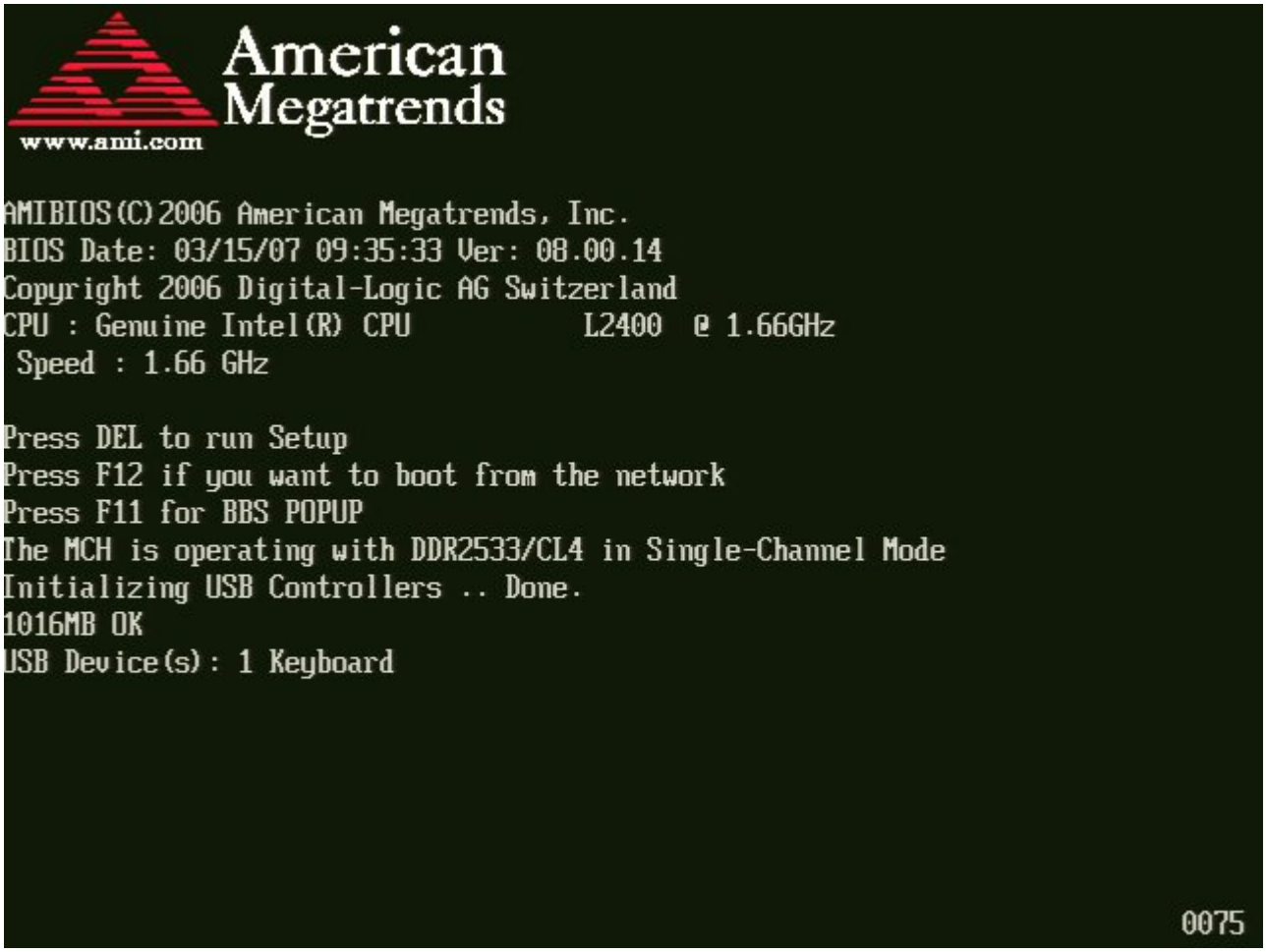
Switch on the external 5V power supply.

Attention!
Jumper X80 determines the behavior after power-on.



In autostart mode the board will automatically enter the boot sequence and the green power LED will turn on. In non-autostart mode the board will remain in standby mode until the power button is pressed for at least one second.

After a few seconds the screen should display the BIOS initial messages/pictures.


American
Megatrends
www.ami.com
AMIBIOS(C)2006 American Megatrends, Inc.
BIOS Date: 03/15/07 09:35:33 Ver: 08.00.14
Copyright 2006 Digital-Logic AG Switzerland
CPU : Genuine Intel(R) CPU L2400 @ 1.66GHz
Speed : 1.66 GHz
Press DEL to run Setup
Press F12 if you want to boot from the network
Press F11 for BBS POPUP
The MCH is operating with DDR2533/CL4 in Single-Channel Mode
Initializing USB Controllers .. Done.
1016MB OK
USB Device(s): 1 Keyboard
0075

4.1. BIOS Setup

Since the BIOS is auto-configuring during the start-up procedure, normally the user does not enter the BIOS setup. Manual setup is needed only to change the default settings. Please refer to the driver/software/BIOS manual “SMX945” printed from the Product CD for the BIOS setup details.

4.2. Boot Up the Operating System and Install the Drivers

Depending on which boot drive is available, boot up the operating system from the CompactFlash, hard disk, or floppy disk.

To install the drivers, see the driver/software/BIOS manual “SMX945” on the Product CD.

5. INDEX

B

BIOS Setup 25
Block Diagram 13
Boot Up the OS 25

D

Disclaimer 4

E

EMI / EMC 16
Environmental Protection Statement 4

F

Features, Standard 11
Features, Unique 12

I

Install Drivers 25
ISO 9001:2000 10

J

Jumper 22

M

Manual, How to Use It 2

O

Ordering Codes 17

R

Recycling Information 5
RoHS Commitment 8

S

Safety Precautions 8
Security 16
Specifications 14
SQS 10
Standards 7, 12
Swiss Association for Quality and Management Systems 10
Swiss Quality 10
Symbols 6

T

Technical Support 5
Trademarks 4

W

Warranty 5